

# Contribution to Carbon Neutral Society by Biomass use in Coal-fired Boiler - “Introduction of Idemitsu Green Energy Pellet” -

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December, 2024

Idemitsu Kosan Co.,Ltd.

# Idemitsu by the numbers

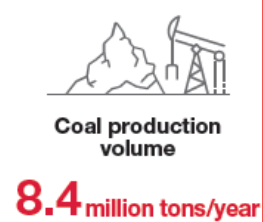
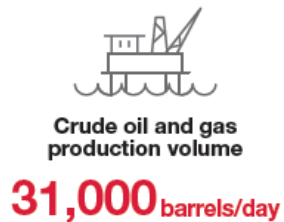
- Company name : Idemitsu Kosan Co.,Ltd.
- Founded : June 20, 1911
- Capital stock : 168.3 billion yen
- 30% share of domestic fuel supply



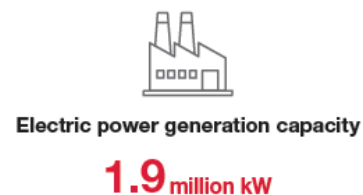
## Petroleum



## Resources




## Power and renewable energy



## Overseas



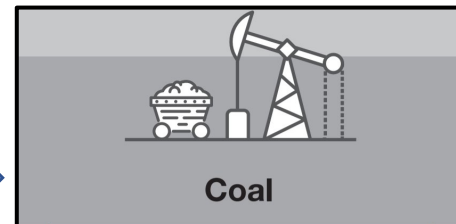
# Idemitsu Business Segments

|  |  |
|--|--|
| <p><b>Petroleum Segment</b></p>            |   |
| <p><b>Basic Chemicals Segment</b></p>      |   |
| <p><b>Functional Materials Segment</b></p> |  |

|  |   |
|--|---|
| <p><b>Power and Renewable Energy Segment</b></p> |  |
|--|---|

|                                 |   |
|---------------------------------|---|
| <p><b>Resources Segment</b></p> |  |
|---------------------------------|---|

<Coal and Energy Solution Department>

|   |
|---|
|  <p><b>Coal</b></p> |
| <p><b>Thermal Coal Sales</b><br/><b>12 million tons/year</b></p>  |

# Coal Business Supply Chain



**Idemitsu's involvement is from coal production until technical support to end users since 1980s**

# Idemitsu Coal Business harmonized with environment

## Supply High grade coal



## ULTY-V plus

(Around 1% Reduction of fuel consumption by combustion control)



## Biomass Co-firing (Black pellet Supply)







## Technical Consulting for Combustion





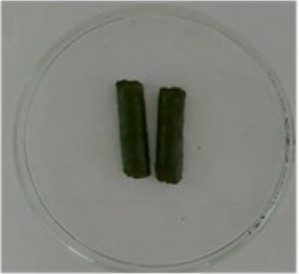



In addition to stable energy supply to Asian economies including Japan, we provide various business menu harmonized with environment.

# Biomass Fuel Comparison

| Type of Fuel               | Picture   | Calorific Value (kcal/kg) | Character  | Suitability for Co-firing at pulverized boiler |
|----------------------------|---|---------------------------|--|--|
| Wood Chip                  |    | 1600- 2800                | <ul style="list-style-type: none"> <li>• Cheap</li> <li>• High moisture</li> <li>• Outdoor storage</li> <li>• Low logistics efficiency</li> </ul>                    | △  |
| White Pellet               |    | 3600- 4000                | <ul style="list-style-type: none"> <li>• Indoor storage</li> <li>• Middle logistics efficiency</li> </ul>  | △  |
| Black Pellet               |    | 4300- 5500                | <ul style="list-style-type: none"> <li>• Outdoor storage*</li> <li>• High logistics efficiency</li> <li>• Good grindability</li> </ul>                               | ◎  |
| PKS<br>(Palm Kernel Shell) |  | - 4500                    | <ul style="list-style-type: none"> <li>• Bad grindability</li> <li>• Outdoor storage*</li> <li>• High logistics efficiency</li> <li>• Quality fluctuation</li> </ul> | ×  |

**Black Pellet is more suitable fuel for co-firing in coal-fired power plants without additional investment for equipments.**

# Waterproof of Black Pellet

|      | Black Pellet   | Wood Pellet  |
|------|--|--|
| 0min |  |   |
| 5min |  |   |
| 1day |  |  |

**Black Pellet is hardly disintegrated  
and does not collapse**

# Good Characteristics of Black Pellet against White Pellet

✓ Higher energy density



Efficient for logistics  
Smaller space for stock

✓ Good grindability



Higher co-firing ratio at pulverized coal boiler  
(White: ~ 5% ⇒ BP ~ 30%)

✓ Waterproof /  
No self-degrade



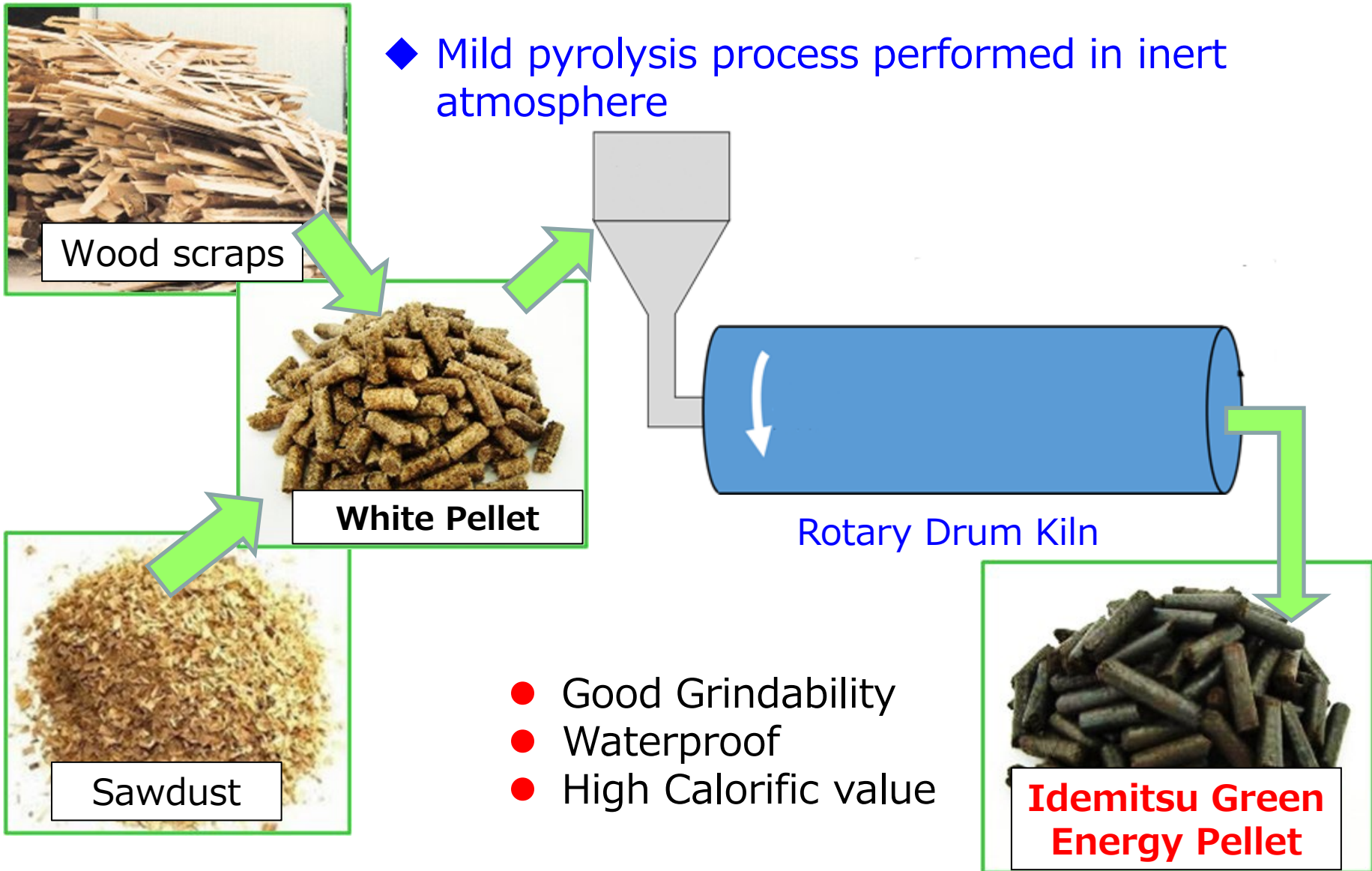
Reduce/No additional investment  
for outdoor storage\*

**Handling in the similar way as coal**

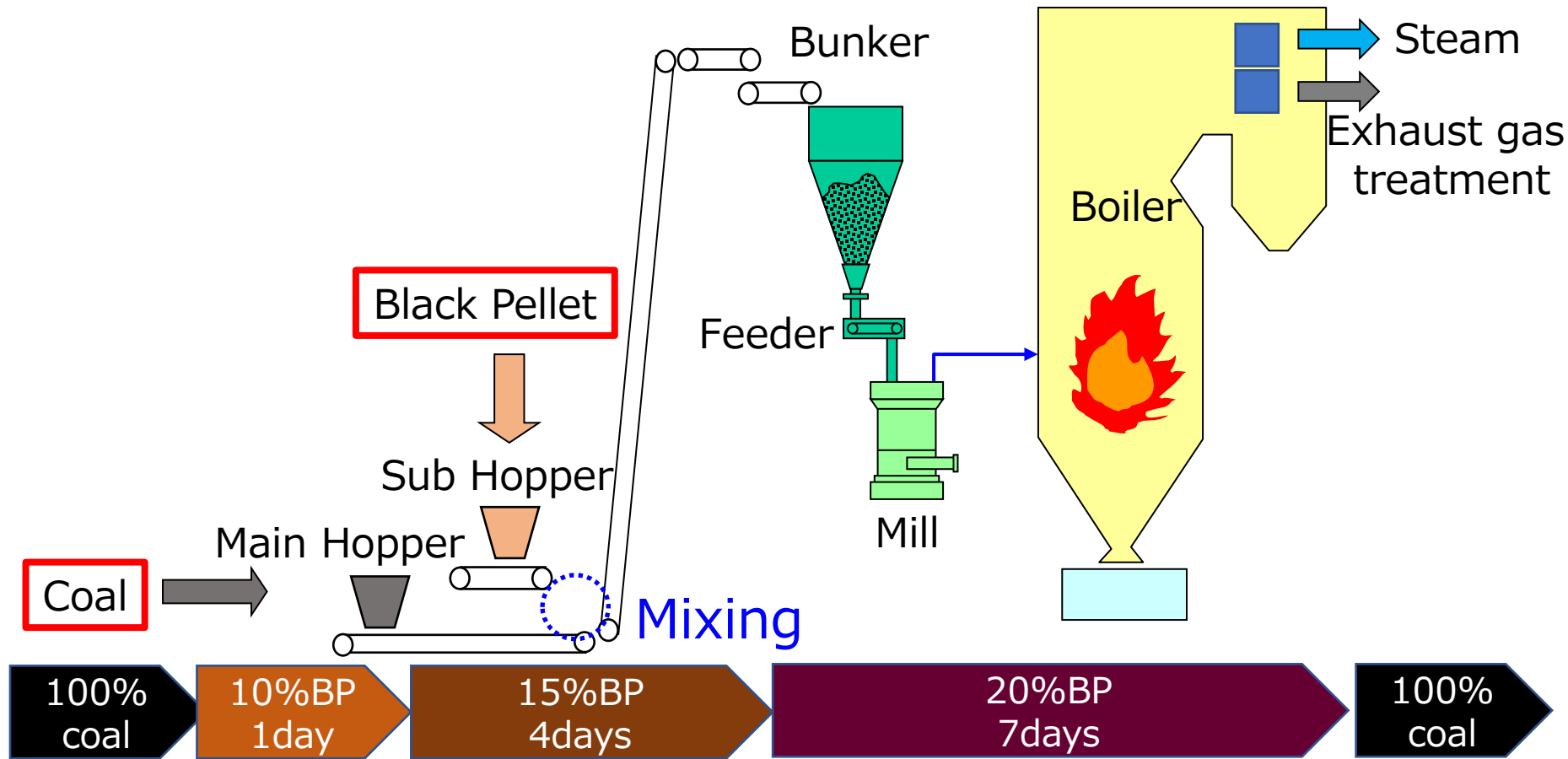


# How to produce Black Pellet?

- ◆ Mild pyrolysis process performed in inert atmosphere



# Co-firing Test



- **Already, similar co-firing tests have been made in 20 power plants and factories and we have got the positive feedback from our customers.**

# 1st Commercial Plant in Viet Nam

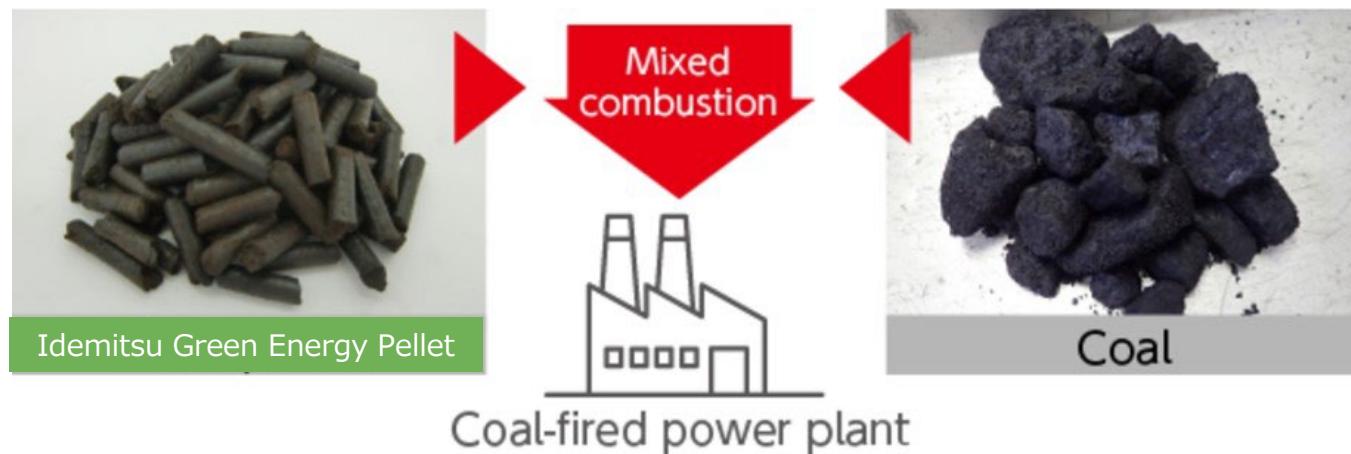


- **Producer** : Idemitsu Green Energy Viet Nam
- **Location** : Binh Dinh
- **Feedstock** : Acacia
- **Capacity** : 120,000t/year
- **Technology** : Rotary kiln
- **Status** : Commercialized in end of 2024
- **Product** : **"Idemitsu Green Energy Pellet"**

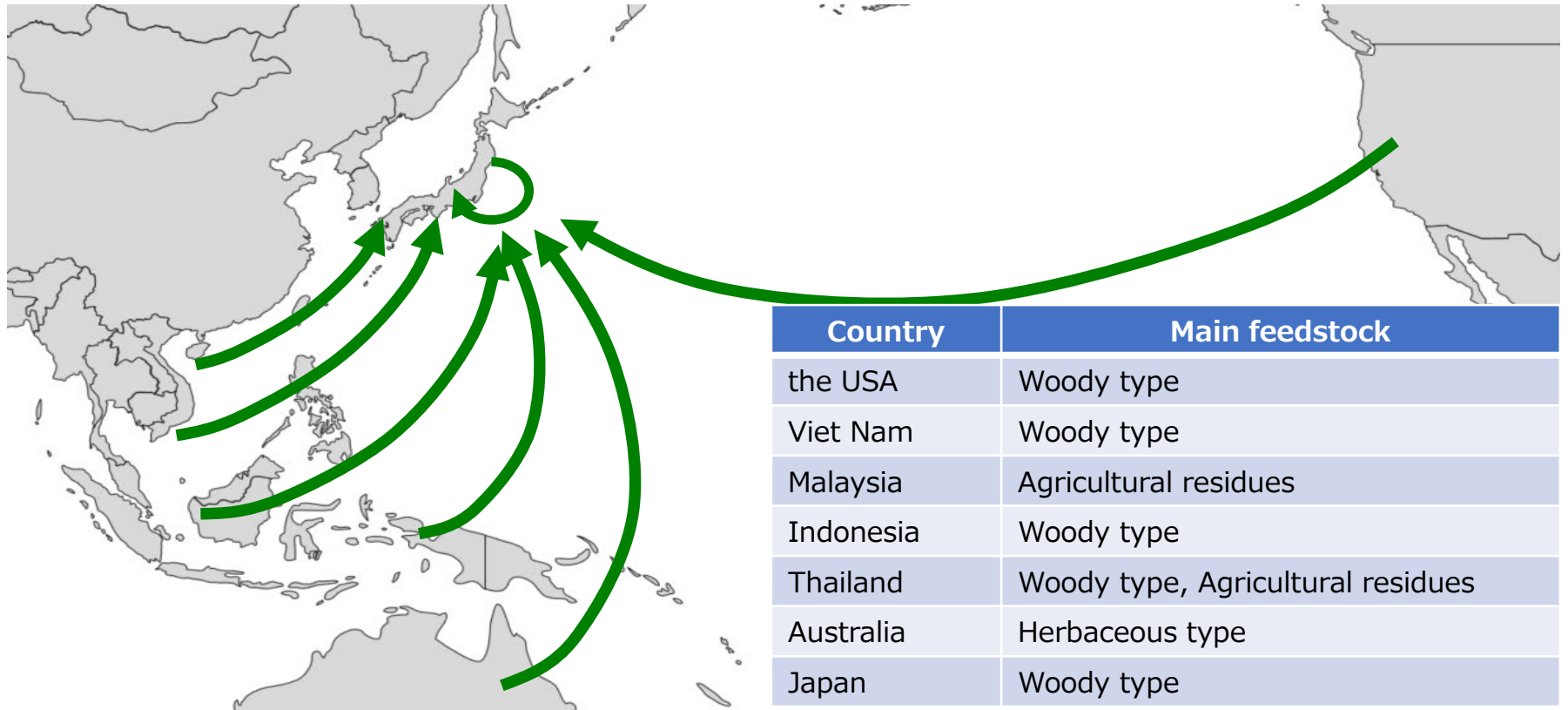


# Idemitsu Green Energy Pellet

- Idemitsu is preparing the black pellet (Idemitsu Green Energy Pellet) business for coal users.
- Japanese coal users show big interest in “Idemitsu Green Energy Pellet” for their co-combustion and reduction of coal use.
- 1st commercial plant in Binh Dinh, Viet Nam is scheduled to start commercial operation in 2024.
- We are looking for our business partners mainly in Southeast Asia who can supply feedstock (woody type, agricultural residue) to increase our production volume.



# Business Expansion Image



- Targeting to supply 3 million tons of BP by 2030 by mixture of various types of involvements, such as a minor shareholder and just a product offtaker.
- Investigating potential feedstock supply around the Pacific Ocean including agricultural waste and our own plantation.

# Japan Black Pellets Forum

## 1. Establishment : February 2022 -

- ✓ Established on the recommendation of a Director of the Energy Conservation Division of METI.
- ✓ Started its activity with the goal of becoming an industry association for Black Pellets (BP) and serving as the industry's liaison to the Japanese government.

## 2. Purpose of this Forum

- ✓ Sharing of knowledge & information about BP supply and utilization
- ✓ Establish guideline and quality standard for Black Pellets
- ✓ Collaboration with Government and engaging in Lobbying activities
- ✓ Enhancement of the safety and competitiveness of BP

## 3. Member companies

- ✓ 36 Japanese enterprises(22 coal user, other are supplier & Logistic etc)  
6 Genco, 4 IPPs, 2 Steel mills, 2 Cement, 1 paper, 5 chemical companies
- ✓ Total coal demand is **75 million tons**
- ✓ Aiming for 20 to 30% BP co-firing with coal before 2030

➔ **15 – 22million tons of BP consumption**

# Summary

- We believe that Idemitsu Green Energy Pellet is **realistic and efficient solution to reduce CO2 emission** for coal users.
- We would expand the production volume to 3 million tons by constructing the plant for Idemitsu Green Energy Pellet around the Pacific Ocean.
- We believe this activity will also meet some purposes of SDGs.

7. Affordable and clean energy

12. Responsible consumption and production

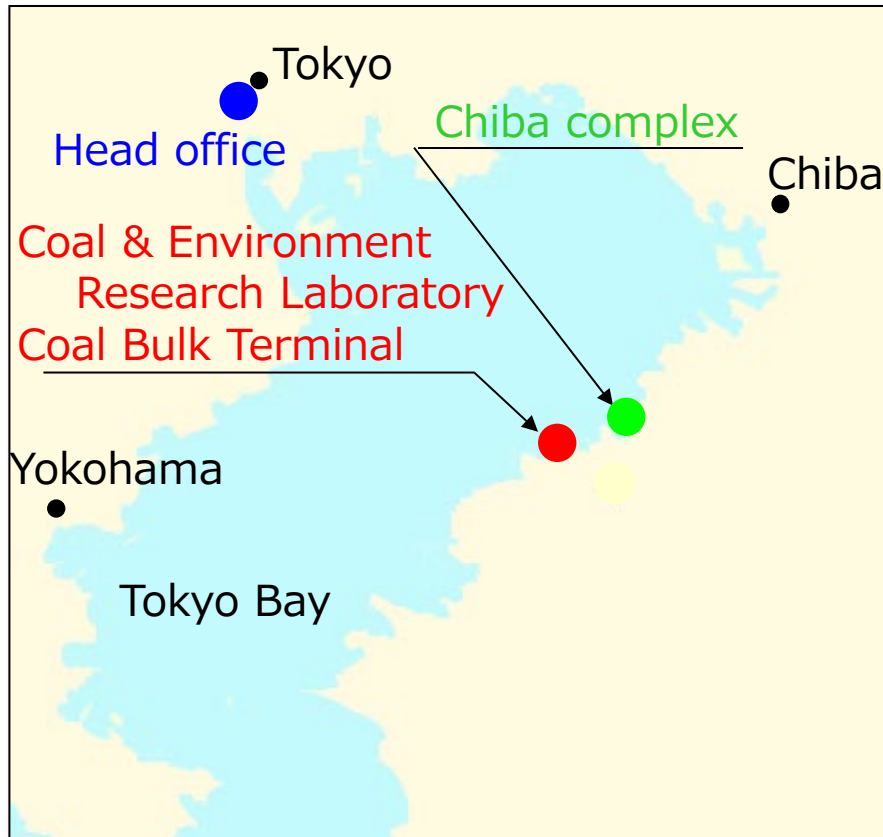
13. Climate Action







# Idemitsu Coal & Environment Research Laboratory



- **Highly efficient Coal Combustion Technology**
  - Combustion Simulation
  - Coal Evaluation System
- **Dust handling, Feedstock Management**
- **Environment Technology Products**
- **Biomass Co-firing technology**

As a unique private research institute specialized for coal in Japan, we are working on the technical consulting to help solving our customers' technical issues and environmental problem and developing various kinds of technical products for promoting highly efficient coal utilization and environmental protection.

# ULTY - Boiler control optimization system -

“ULTY-V plus AT” is the boiler control optimization system with AI which can reduce coal consumption and CO2 emission by connecting with existing boiler control system.



**Reduction of coal consumption:  
Approx. 1%**

Already, Total 101 ULTY system applied :

- Japan 111
- Chinese Taipei 6
- Indonesia 1